## COS226 Group Activity

1. Binary heaps. from Spring 2008 Midterm, Question 5

Consider the following binary heap (i.e., the array-representation of a heap-ordered complete binary tree). In the space below, draw the binary tree-representation of the binary heap.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|
| - | Z | W | Y | Т | G | K | V | R | S | F  | A  | -  | -  |

(a) *Delete* the maximum key. Give the resulting binary heap. *Circle* those values that changed.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|
| - |   |   |   |   |   |   |   |   |   |    |    |    |    |

(b) *Insert* the key X into the *original* binary heap. Give the resulting binary heap. *Circle* those values that changed.

| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|
| - |   |   |   |   |   |   |   |   |   |    |    |    |    |

2. Draw the BST that results when you insert the keys E A S Y Q U E S T I O N, in that order into an initially empty BST. How many compares are needed to build the tree?

3. Draw the BST that results after delete('I'). Give the BST if we follow up delete('I') with delete('S').